REMARKS

Claims 1, 4-8 and 13-15, 17-21 and 24-29 are all of the claims pending in the present Application. Claims 6-8 and 19-20 have been withdrawn.

Claims 1, 4, 5, 13-15, 17, 18, 21 and 24-29 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Shiozaki (WO 03/044881) in view of Chen et al. (CN 1416189).

Claims 21 and 28 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Shiozaki and Chen, and further in view of Cho (U. S. Patent Pub. 2003/0211391).

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention, as set forth in independent claim 24, is directed to a positive active material, including base particles able to dope and release lithium ions, and at least one element selected from the group consisting of Gd, Y, La, Ce and Yb formed on a surface of the base particles and not incorporated in the base particles (Application at page 38, lines 16-24; page 39, line 25-page 40, line 5).

Conventional positive active materials include base particles (e.g., $LiCoO_2$). Attempts have been made to modify a surface of these materials with an element of a different kind (e.g., aluminum) to improve electron conductivity. However, this method does not inhibit the oxidative decomposition of the electrolyte in a positive-electrode field (Application at page 2 lines 11-20).

In the claimed invention of claim 1, on the other hand, the positive active material includes at least one element selected from the group consisting of Gd, Y, La, Ce and Yb formed on a surface of the base particles and not incorporated in the base particles (Application at page 38, lines 16-24; page 39, line 25-page 40, line 5). This feature may help to inhibit a reaction between the electrolyte and the positive active material and, thus, inhibit a deterioration of performance of a battery (Application at page 11, line 1-page 12, line 9).

II. THE ALLEGED PRIOR ART REFERENCES

A. Shiozaki and Chen

The Examiner alleges that Shiozaki would have been combined with Chen to form the invention of claims 1, 4, 5, 13-15, 17, 18, 21 and 24-29. However, Applicant respectfully submits that these alleged references would not have been combined and even if combined, the alleged combination would not teach the features of the claimed invention.

In particular, Applicant respectfully submits that these references are unrelated. Indeed, no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the references provide no motivation or suggestion to urge the combination as alleged by the Examiner. Indeed, these references clearly do not teach or suggest their combination. Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Shiozaki, nor Chen, nor any alleged combination thereof teaches or suggests "***at least one element selected from the group consisting of Gd, Y, La, Ce and Yb formed on a surface of said base particles and not incorporated in said base particles***", as recited in claim 24 and similarly recited in claims 1 and 29 (Application at page 38, lines 16-24; page 39, line 25-page 40, line 5). As noted above, this feature may help to inhibit a reaction between the electrolyte and the positive active material and, thus, inhibit a deterioration of performance of a battery (Application at page 11, line 1-page 12, line 9).

Clearly, these features are not taught or suggested by Shiozaki or Chen.

In fact, the Examiner expressly concedes that Shiozaki does not teach or suggest these features on page 4 of the Office Action, stating that "Shiozaki et al. does not disclose an element that is not a part of the base particles that is able to come into contact with the electrolyte is formed on base particles".

Likewise, Chen does not teach or suggest these features of the claimed invention.

Chen et al. (CN 1416189) disclose a secondary battery having its positive active

material covered with a specific material and thereby exhibiting high reversible capacity, excellent cycle performance and high safety. Attached hereto as EXHIBIT 1 is an English language Translation of Excerpts of Chen, including an English language translation of the sentences in "[57] ABSTRACT" on the front page of Chen et al. (CN 1416189)).

Further, Chen et al. (CN 1416189) teaches (1) carbon materials, (2) oxides and (3) salt-based substances as the covering material on page 3 thereof. At (2) oxides, Chen et al. (CN 1416189) give a simple listing of as many as 36 elements (Mg, Al, Si, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Zn, Ga, Ge, Ba, Y, Zr, Mo, In, Sn, Ta, W, La, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu and Ce) as composing the oxides, as well as a listing of specific compounds (MgO, Al_2O_3, SiO_2, SnO, TiO_2, SnO_2, V_2O_5, VO_2, MnO_2, Fe_2O_3, Fe_3O_4, $LiCrO_4$, $LiAlO_2$, $LiCoO_2$, $LiNiO_2$ and $LiMn_2O_4$) (e.g., see EXHBIT 1 which includes an English translation of the paragraph including (1), (2) and (3) on page 5 (i.e., page 3/13), line 15-26 in Chen et al. (CN 1416189)).

Further, Table 1 on pages 12-13 of Chen et al. (CN 1416189) teaches various covering materials used as examples and the results thereby obtained (e.g., see EXHBIT 1 which includes an English translation of the phrases in the first row of Table 1 on page 14 (i.e., page 12/13) in Chen et al. (CN 1416189)). They include an example in which Al_2O_3 is used.

However, Chen et al. (CN 1416189) do not teach or suggest any specific compound containing any of the elements (Gd, Y, La, Ce, Yb), nor do Chen et al. teach or suggest any specific working example in which compounds containing the elements (Gd, Y, La, Ce, Yb) are employed, though Chen et al. simply list those elements among the 36 elements.

Referring now to the claimed invention, an object of the claimed invention is "to provide a positive active material which can inhibit side reactions between the positive electrode and an electrolyte even at a high potential and which, when applied to a battery, can improve charge/discharge cycle performance without impairing battery performances even in storage in a charge state" (Application at page 6, lines 12-18), which is basically different from the effect of the invention of Chen et al. (CN 1416189).

This difference is clearly supported by the following disclosure of Chen et al. (CN 1416189). Chen et al. (CN 1416189) do <u>not</u> teach or suggest any specific compound containing

any of the elements (Gd, Y, La, Ce, Yb) featuring the claimed invention of claim 24, but one of the elements shown specifically as working examples by Chen et al. is "Al", which is employed in Comparative Example 3 in the present application. See Table 3 in the present specification.

An effect of the claimed invention may be manifested by the value of "Floating integrated ampere-hour capacity (μAh/g)". The smaller the value, the greater effect it manifests. See Comparative Example 3 employing Al. Its value is greater than the value of Comparative Example 2 employing no such element. This confirms that the presence of Al produces a worse result than its absence, as far as the effect of the claimed invention is concerned.

It is clear from the foregoing that even assuming (arguendo) that the positive active material of the claimed invention may have been known in the art when the present application was filed, the claimed invention would not have been obvious in view of Chen et al. In fact, the application of the teaching of Chen et al. to the "positive active material" would have produced a result opposite to a result which was intended by the claimed invention. Thus, Applicant respectfully disagrees with the Examiner and respectfully submits that the claimed invention would not have been obvious from Shiozaki et al. in view of Chen et al., since Shiozaki et al. merely disclose a positive active material of the specific composition. The Examiner is wrong in stating on page 3 that "Shiozaki further discloses that the positive active material may comprise $LiCoO_2$ which corresponds to point A on fig. 1", since it is not $LiCoO_2$, but $LiMn_{0.5}Ni_{0.5}O_2$ that corresponds to point A. Shiozaki et al. do not disclose or suggest any active material comprising $LiCoO_2$, since $LiCoO_2$ corresponds to the left bottom apex of the triangle in FIG. 1, and is outside the area ABCD claimed by Shiozaki et al. However, the claimed invention would not have been obvious from Shiozaki et al. in view of Chen et al., as pointed out above, regardless of whether Shiozaki et al. disclose $LiCoO_2$.

Thus, like Shiozaki, Chen does not teach or suggest a positive active material which includes **at least one element selected from the group consisting of Gd, Y, La, Ce and Yb** formed on a surface of the base particles and not incorporated in the base particles, as in the claimed invention.

Therefore, Applicant respectfully submits that these alleged references would not have

been combined and even if combined, the combination would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. Cho

The Examiner alleges that Shiozaki and Chen would have been further combined with Cho to form the invention of claims 21 and 28. However, Applicant respectfully submits that these alleged references would not have been combined and even if combined, the alleged combination would not teach the features of the claimed invention.

In particular, Applicant respectfully submits that these references are unrelated. Indeed, no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the references provide no motivation or suggestion to urge the combination as alleged by the Examiner. Indeed, these references clearly do not teach or suggest their combination. Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Shiozaki, nor Chen, nor Cho, nor any alleged combination thereof teaches or suggests "***at least one element selected from the group consisting of Gd, Y, La, Ce and Yb formed on a surface of said base particles and not incorporated in said base particles***", as recited in claim 24 and similarly recited in claims 1 and 29 (Application at page 38, lines 16-24; page 39, line 25-page 40, line 5). As noted above, this feature may help to inhibit a reaction between the electrolyte and the positive active material and, thus, inhibit a deterioration of performance of a battery (Application at page 11, line 1-page 12, line 9).

Clearly, these features are not taught or suggested by Cho.

Indeed, Applicant notes that Cho teaches an active material for a battery, and a surface-treatment layer formed on the active material (Cho at Abstract). In particular, Cho teaches the following:

> *The element M used for the coating liquid is an alkali metal, an alkaline earth metal, a group 13 element, a group 14 element, a transition metal, a rare-earth element, or a combination thereof. The preferable examples of these elements are Al, Ni, Co, Zr, Mn, Cr, Fe, Mg, Sr, V, or a combination thereof. The group 13 element (according to the new IUPAC agreement) refers to the element group including Al of the Periodic Table. The group 14 element (according to the new IUPAC agreement) refers to the element group including Si of the Periodic Table.* (Cho at [0039])

That is, the elements characterized by the claimed invention is (Gd, Y, La, Ce, Yb), but Cho is specifically silent about any one of the elements.

Thus, Cho clearly does not make up for the deficiencies in Shiozaki and Chen.

Therefore, Applicant respectfully submits that these alleged references would not have been combined and even if combined, the combination would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicants submit that claims 1, 4-8 and 13-15, 17-21 and 24-29, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 2/9/11

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing was filed by facsimile with the United States Patent and Trademark Office, Examiner Jacob B. Marks, Group Art Unit # 1729 at fax number (571) 273-8300 this 9th day of February, 2011.

Phillip E. Miller
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English Translations of Excerpts of Chen et al. (CN 1416189)

An English translation of the sentences in "[57] ABSTRACT" on the front page thereof

[57] ABSTRACT

The present invention relates to a technological field for high energy batteries. The lithium secondary battery of the present invention is composed of a positive electrode containing a composite material covered and modified by a nano-surface as an active material, a negative electrode composed of a substance which is capable of storing lithium, a membrane composed of an electrolyte solution, a polymer electrolyte or a solid electrolyte, a collector, a housing and leads, etc. The covering material is one kind or more kinds selected from semi-metals, oxides or salt-based substances, and has the particle diameter of 0.1 to 200nm, the average thickness of 0.5 to 200nm. The lithium secondary battery of the present invention shows high reversible capacity, excellent cycle performance and high safety and can suitably be applied to various cases. The present invention can be produced to various specifications such as button types and cylindrical types.

An English translation of the paragraph including (1), (2) and (3) on page 5 (i.e., page 3/13), line 15-26 thereof

The covering material of the present invention may be one or a mixture of two or more selected from the following materials:

(1) Semi-metals: carbon materials including various hard carbon materials, soft carbon materials, graphites, graphitized materials and modified graphite-based materials.

(2) Oxides: Oxides or composite oxides composed of metals or non-metals of the groups IIA-VIIIA and groups IIB-VIB of the 2nd to 6th period in the periodic table of elements. Specific examples of the oxides or composite oxides can be the oxides or composite oxides composed of Mg, Al, Si, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Zn, Ga, Ge, Ba, Y, Zr, Mo, In, Sn, Ta, W, La, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Ce, such as MgO, AL_2O_3, SiO_2, SnO, TiO_2, SnO_2, V_2O_5, VO_2, MnO_2, Fe_2O_3, Fe_3O_4, $LiCr_2O_4$, $LiAlO_2$, $LiCoO_2$, $LiNiO_2$, $LiMn_2O_4$.

(3) Salt-based substances: Li_3PO_4, $ALPO_4$, $Mg_3(PO_4)_2$, $LiMPO_4$(M=Mg, Fe, Co, Ni, Cr, Ti or V) or LiF.

An English translation of the phrases in the first row of Table 1 on page 14 (i.e., page 12/13) thereof

Covering materials	Active materials	Charging voltages	Discharging voltages	Initial discharging specific capacities	Cycle parameters

EXHIBIT 1